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Dissolving the digital divide: Creating coherence in young people's social ecologies of learning and identity building

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Introduction

Today's children increasingly grow up in media-rich homes, and are in daily contact with a wide range of digital tools (e.g., Chaudron, 2015). Digital practices and contents are becoming an important source of many young people's "cultural curriculum" not necessarily in the sense of preferable but in the sense of pervasive (Wineburg, Mosborg, Porat, & Duncan, 2007). At the same time, recent educational efforts motivated by the need to make the school curriculum more relevant for young people, and to support their readiness for the 21st century including digital literacy have begun to explore the ways in which to meaningfully bridge the informal digital practices of contemporary youth with formal schooling (Hung, Lee, & Lim, 2012; Ito, et al., 2013). These developments stem from an accumulating body of research that points to a need to create coherence between formal and informal learning (Rajala et al., 2016; Bronkhorst & Akkerman, 2016). For example, emerging research suggests that disengaged students could become more engaged at school if socio-digital technologies they use in their informal lives were also made available to them at school (e.g., Salmela-Aro et al., 2016). There are also concerns for social equity and inclusion; for some students constructing coherence between school and other spheres of their lives is much easier than for others, with serious consequences for their success in school (Ito et al., 2013; Phelan et al., 1991). Furthermore, creating coherence between school instruction and students' everyday reasoning and cultural practices can support robust

conceptual learning and engagement in authentic disciplinary practices in studies of different school subjects (e.g., Rosebery et al., 2010; Wong et al., 2010).

Curriculum reforms and pedagogies enriched by the use of digital technologies and media are being developed to connect with young people's everyday lives aligned with their experiential worlds and personal aspirations, including informal digital practices (Loveless, & Williamson, 2013). For instance, in Finland the new national core curriculum calls for learning environments and pedagogies that draw upon students' life worlds in and out of school (FNBE, 2014). The rationale for this approach is to relate with, critically examine, and further extend young people's learning experiences in and out of school, and in general to make learning at school more interesting and relevant to students encouraging their lifewide and lifelong learning (Kumpulainen & Sefton-Green, 2014). Furthermore, as young people's informal lives and peer cultures are widely reported to be strongly related to their academic engagement and learning (e.g., Bempechat & Shernoff, 2012; Bernt & Murphy, 2002), attention in education is increasingly directed to the social ecologies of young people's learning, defined as a set of interacting sites in young people's lives that mediate their engagement, learning and identity building (Barron, 2006).

In this chapter, we will direct our attention to the rationales of recent research on educational efforts to connect school learning with young people's digital practices in- and out-of-school. By drawing on recent research studies in the field, we will reflect on the conditions and implications of such efforts and what is currently known about how these mediate and position young people's learning and identity building. Instead of directing our attention to divides between in-school and out-of-school learning or between the "digital generation" and other age groups, in this chapter we discuss what recent research says about the ways in which school can become a space in which young people's digital practices can transformatively converge with schooling, and how this convergence is related to their learning and identity building.

We begin our narrative reflection of current research by focusing on the myth of digital natives. In doing so, we demonstrate the important role of educational institutions in fostering every young people's technological fluency, digital literacy and other 21st century knowledge and competencies. Next, we will conceptualise recent efforts to researching and understanding young people's engagement, learning and identity building across sites and contexts. We will then turn to illuminating some key rationales of current educational research on creating convergence in young people's social ecologies via the use of digital technologies and media. We conclude our reflections by pointing out that although there are some promising findings on how digital technologies and media can create convergence across sites and contexts of young people's engagement and learning, too often young people are positioned authoritatively to standardized expectations of the school and society. Less research attention is given to young people's personal sense-making and self-making mediated by their use of digital technologies and media across contexts, and how formal education could build on these practices for academic, vocational and/or civic ends.

“Digital natives” - a problematic category

For the last two decades or so, young people have oftentimes been characterized by notions such as 'digital natives' (e.g., Prensky, 2001), 'digital generation' (e.g., Tapscott, 1998) or in terms of other portrayals of expert technology users. Proponents of such categorisations have argued for the highly active, engaged, and resourceful kinds of learning young people are gaining, for example, with digital games and online activities (Ito, et al., 2013). However, there is very little research evidence to support the claims that all young people are digitally savvy and that they have radically different patterns of knowledge creation and sharing in comparison with older generations. In fact, the level of digital competencies among children in Finland and throughout Europe is found inadequate (European Commission, 2013). Young people are reported to be adept in using technologies for operational purposes but they generally lack more advanced competencies, such as critical literacy (Ala-Mutka, 2011). Overall, research indicates that mere exposure to technology does not equate with the development of more advanced digital

competencies. The picture of young people as being information-savvy digital natives is more of a myth than an evidence-based claim (Kirscher & De Bruyckere, 2017).

Also labeling youth under a unified label of 'digital natives' or alike category based solely on generational differences is argued to be flawed and misleading (Bennett, Maton, & Kervin, 2008). Not all young people have equal opportunities to use digital technologies fully due to various social and cultural factors, lack of interest and confidence or social support (Ala-Mutka, 2011). Altogether, the digital native paradigm discounts technical skill disparities that result from developmental, socioeconomic, gender, and cultural differences; effectively erasing the educational needs of the individual; and privileging the technically adept (Bennett, et al., 2008).

Although physical access to digital media is becoming less of an issue there are stark differences among young people in access to learning opportunities that will help position them to use media in ways that can promote their own development and career paths (Barron, 2006). It is generally educationally privileged youth with productive learning supports at home who are able to take full advantage of the new learning opportunities that the online world has to offer and to translate these opportunities to their academic and/or career success (Li, Hietajärvi, Palonen, Salmela-Aro, & Hakkarainen, 2017; Ito et al., 2009). Hence, the role of educational institutions in supporting every young people's learning and identity, building in and for the digital age deserves attention.

Learning in school and out: From dichotomies to convergence

The uptake of digital technologies and media in various spheres of life has changed the ways in which young people can access information, create and consume, use and produce meaning and knowledge, how they can interact with others, how they can engage in learning and, and how they see themselves and their futures (e.g., Li, et al., 2017). The growing diversity and fragmentation of today's media ecology means that young people have a greater range and choices in their participation, learning and identity building (e.g., Erstad, et al., 2016). It is evident that the sites and contexts of learning of many young people, at least in the Western

world, have expanded and transformed from the time when Lauren L. Resnick (1987) wrote her seminal paper on the discrepancies of in-school and out-of-school learning. For her, school learning is typically based on individual performance, symbolic thought, and general skills and knowledge. Out-of-school learning, on the other hand, is mostly socially shared, tool-aided and embedded in mediating objects, resources and situations, resulting in contextualized competencies, skills and knowledge practices (Resnick, 1987).

While contrasts between the dominant features of learning in-school and out are valuable in extending our understanding the contextuality of learning, this limited view of in-school and out-of-school learning easily leads to oversimplifications on the nature of young people's engagement, learning and identity building in the digital age. Most importantly, this kind of conceptualization is unable to explain the convergences and inter-relationships between various sites and contexts in young people's social ecologies. For example, to date we have little knowledge how young people's informal digital literacy practice mediate their engagement and learning at school. We also know little how learning at school travels to and impacts young people's informal lives. Yet, the questions of how, when, and why young people learn are particularly salient now, as there has been a rapid increase in access to information and to novel kinds of technologically mediated learning environments. Understanding how engagement, learning and identity are distributed among multiple settings and resources is hence an increasingly important goal.

Today, educational researchers are increasingly directing their attention to researching young people's learning and identity building across sites and contexts (e.g., Erstad, et al., 2016). For the most part, these studies have been guided by sociocultural theorization on human learning and development (e.g., Cole, 1996) where learning is conceived as ontological and ideological as much as it is epistemological. This intertwined and holistic understanding allows researchers to approach young people as actors who participate not only in school but other contexts which dynamically interact with one another and contribute to their meaning-making (i.e. learning) and self-making (i.e., identity building) (McLay, Renshaw, & Philips, 2016).

The sociocultural framing defines learning as a social construct that emerges in interaction while people participate in and contribute to various activities mediated by different communities, participants, rules, instruments and artifacts. Here, learning is understood as a holistic experience of participation situated across multiple sociocultural contexts, not as something that takes place exclusively in one setting, such as in formal education (Ludvigsen, Lund, Rasmussen, & Säljö, 2010). Hence, rather than seeing technology use in schools merely in terms of “digital divides” or inequalities of access, many of these studies have turned their attention to the broader social contexts and symbolic resources that structure diverse educational uses of new media that lead to certain forms of engagement, learning and identity formation among young people.

Creating convergence in young people’s social ecologies

We can identify a variety of rationales for the use of digital technologies and media in education to promote young people’s learning and identity building across sites and contexts, also captured in the notions of ‘seamless’ or ‘anywhere anytime’ learning (Wong, 2013). As McLay, Renshaw, and Philips (2016) point out, many of these approaches direct their attention to mobilising young people’s learning across physical and social space (Kearney, Schuck, Burden, & Aubusson, 2012); interest (or ‘conceptual mobility’), and time (Sharples, Arnedillo-Sanchez, Mildrad, & Vavoula, 2009). In a recent review of research literature Rajala et al. (2016) further explicated efforts to these approaches by identifying three, often overlapping rationales that have guided educational efforts to build convergence in young people’s learning across sites and contexts. Namely, the rationales dealing with efforts to promote a) equity and educational inclusiveness, b) learning requirements and competences of the 21st century; and c) learner agency and identity. Our narrative review of empirical research in the field have been inspired by this distinction of rationales, and we use these rationales as heuristics to guide our work. However, in the context of our work we have adjusted these rationales in order to better address the role and meaning of digital media and technologies in mediating young people’s learning and identity building across sites and contexts.

Opening up and valuing diverse opportunities for educational engagement

The rationale of educational inclusiveness stems from efforts for opening up diverse opportunities for young people's educational engagement in which they can harness various cultural resources stemming from their social ecologies to make meaning of their learning and becoming. An example of such an effort is a study by De Lange (2011) on vocational media studies course in a Norwegian upper secondary school. In this study inclusiveness was tied with efforts to promote young people's 21st competencies as the students were invited to address curricular goals on the basis of their informal media experiences. In the course, media teachers and their students worked together to collaboratively plan, execute and evaluate classroom-based media projects. The findings of the study showed that the participative procedure of the course created a transactive space for students to bring in their informally developed expertise in using digital tools and to challenge the structuring of the classroom work. However, the author cautions that the students' experiences in using digital tools did not guarantee a reflective or knowledgeable perspective on their own digital practice. Instead for developing productive strategies of digital production, it was found essential that the teachers also confronted and challenged the students' perspectives.

Some other studies have also documented the creation of online learning spaces that resembled those that young people are commonly known to use in their leisure time in order support young people's educational engagement (Lantz-Anderson et al., 2013; Kumpulainen & Mikkola, 2014; Vigmo & Lantz-Anderson, 2014). The aim has been to let the students take these digital spaces as theirs and to enable them to use the advanced and creative media practices they have developed in their leisure time for academic learning. The digital spaces have included commercially available digital tools such as blogging (Vigmo & Lantz-Anderson, 2014), Facebook groups (Lantz-Anderson et al., 2013), and various online collaborative learning spaces (Kumpulainen & Mikkola, 2014).

Building competencies for active participation in the 21st century society

The educational rationale of 21st century learning requirements, addresses young people's competences for active participation in the academic, working, and/or civic lives. Such rationales are evidenced, for example, by studies that document young people's creative competencies across school and out-of-school sites, and which have positioned young people in the role of active producers instead of mere consumers of digital technologies and media (see e.g., de Lange, 2011). In these studies the expertise that students developed outside of school, such as in digital production, were not seen as self-sufficient but complementary to what they developed in school.

Other studies addressing the promotion of young people's 21st century competencies, including civic engagement and citizenship have examined educational activities that deal with complex problems with social significance (Rajala et al., 2013). For example, Fauville et al. (2016) studied how a digital tool for calculating carbon footprint was used by high school students around the world. The carbon footprint calculator measures the quantity of a person's carbon dioxide emissions associated with their lifestyle and visualizes this otherwise invisible aspect of the person's environmental impact. The students used the calculator to determine how different activities of their everyday life contributed to their carbon footprint and compared the results to the local and global averages. Students were also prompted to reflect on how to reduce their carbon footprint. The averages of each of the participating classes worldwide were then displayed on a digital map and the students took part in international online discussions about the topics of climate change and its mitigation. Finally, students completed a questionnaire regarding the pedagogical activity. The study showed that involvement in the activity triggered emotionally and morally charged reactions, such as pride and guilt, among the students. The pedagogical activity also allowed the students to shift their focus between local and global perspectives in ways that challenged and expanded their views about the topic. The focus on a local perspective was found important because reflections at this level enabled students to feel responsible for the environment and take action. Yet, the possibility to shift to a global perspective fostered the students' awareness of the issues at a general level enabled them to make sense of their local life styles in the global context.

In some other educational efforts, the focus has been on young people's "abilities to self-direct" learning whilst engaging in learning activities across contexts. Here, self-directed learning has been considered as a valued learning outcome in itself. This argument is visible in the so called seamless learning approach (Wong, 2013). Wong (2013) presented two design experiments in Singapore in which seamless learning was fostered by giving primary school students smart phones that featured a digital camera and a mobile learning environment software. The smart phones functioned as "learning hubs" that the students carried with them all the time enabling them to manage their seamless learning across contexts and activities. The pedagogical design involved a cyclical model consisting of four types of activities: learning engagement, personalized learning, online social learning, and in-class consolidation. Some of these activities took place in formal and some in informal settings. The first design experiment involved learning of idioms in Chinese, and the second one involved a series of inquiry-based science learning projects. Among other things, in both of the projects the students made observations and took photos in their daily encounters outside of school and associated these photos with the knowledge learned in the class. The students' photos and other learning products that they created were then discussed in virtual learning environment among peers and in class facilitated by the teacher.

Whilst in both of the projects the seamless learning design contributed to the conceptual learning of the students, indications of the emergence of limited but growing self-directed seamless learning were documented. In the first design experiment the students started to take photos illustrating given idioms in their homes and in other locations of their everyday life on their own initiative. Thus, the formal artefact creation activities "spilled into" the students' informal settings. In the second design experiment, the students started to sustain informal inquiries on topics of their own interest with the aid of the smart phones. The researchers interpreted these as indications of their success in "planting a seed of seamless learning in the children".

Identity building across sites and contexts

Educational rationales addressing young people's identities across sites and contexts focus on young people's identity negotiations in relation to others, digital technologies and media and the contexts of their activities (Erstad & Sefton-Green, 2013). For instance, in their research, McLay, Renshaw, and Philips (2016) explored the fluid shifts and transformations of learner identities in response to the mediating influence of the iPad taken up in an Australian high school to enable students to move fluidly between in-school and out-of-school contexts. Following Bakhtinian perspectives, these researchers attempted to illuminate young people's identity building by making visible the ways the students negotiated their identities in relation to social resources and material resources, sometimes taking up and at other times resisting and rejecting various possible selves.

Altogether, a review of existing research reveals that there is fairly little documented research on young people's identity building processes in relation to educational efforts that have aimed building coherence in young people's learning across sites and context via the use of digital technologies and media. Furthermore, many of the reported educational activities have been framed authoritatively with expected ways of working, learning and being with little attention to young people's self-making processes. These reported educational activities have positioned young people with somewhat pre-defined identities to which they are assumed to aspire and which are to promote particular kinds of desired futures for the youth. Such forms of identities often entail being active, creative, connected, autonomous and self-responsible (Loveless & Williamson, 2013).

Efforts that recognise and build on young people's own aspirations and motives are typically situated in other contexts than schools, such as, in after-school clubs, libraries, science centers and other cultural communities (e.g. Ito et al., 2013). Here, young people are supported to pursue their personal interests with the support of peers and adults with the goal of linking these initial interests to academic achievement, career success and/or civic engagement. In doing so, such connected learning efforts aim to harness "digital technologies and media to more easily link home, school, community and peer contexts of learning; support peer and intergenerational connections based on shared interests; and create more connections with non-dominant youth,

drawing from capacities of diverse communities” (Ito et al., 2013, pp. 4). It remains to be seen how such “connected learning” efforts will travel to schools and how they manage to embody the values of students’ equity, social belonging, and participation, as advocated by such approaches.

Conditions and challenges

While there are some promising findings how digital technologies and media can mediate convergence across sites and contexts in young people’s digital engagement, learning and identity building, existing research has also pointed out challenges and critical conditions that are worthy of attention to guide future research and educational practice.

Extending official classroom space to incorporate students’ everyday ways of being

The study by Lantz-Anderson et al. (2013) which focused on the pedagogical use of a Facebook group in English-learning classes, with 60 students aged between 13 and 16 from Colombia, Finland, Sweden and Taiwan, showed that the ways in which these spaces were framed in formal instruction created tensions with those of the students’ peer culture and everyday interactions. The study showed that the conventional educational activity was resistant to being extended to incorporate non-school language use and that the conventional framing of the activity was sustained both by the teacher and the students. However, an expansion of the activity took place through students’ playful, everyday interactions that challenged the formal language use in the group. A posting by one of the students that made fun of the assignment generated a lively interactional exchange of comments that diverged from a formal language use at school and resembled young people’s everyday interactions in social media. The results of the study highlight that extending the official classroom space to incorporate students’ everyday ways of engaging in digital media was not trivial. Despite the seemingly unproductive nature of these exchanges, at times, they were found to mark a shift in the interaction pattern after which the students more frequently commented on each other’s postings. Also Kumpulainen and Mikkola (2014) in their study of primary school students’ chat interaction during collaborative writing of a school musical script both inside and outside school found out that seemingly “useless”

everyday interactions of the students played an important role in building trust and social relationships. The study also reports that boundary crossing in the students' chat interactions gave rise to hybrid spaces where the discourses of schooling and everyday life intersected.

As these studies show, the values and identities young people themselves wish to pursue can sometimes be at odds with what is considered appropriate in a school setting or teachers could find it risky to allow students to bring some aspects of their lives to school. Nevertheless, attending to more difficult aspects of students' lives can connect instruction to vital personal meanings in the students' lives and foster deep engagement in school learning (Zipin, 2009; Thomson & Hall, 2008). Conversely, the avoidance of topics that are of central importance in some of the students' lives may alienate these students from instruction. It is also important that the "cultural curriculum" of students' informal lives is brought under joint reflection, critical analysis and elaboration in the schools, as to guide students' learning, and identity building towards enriched directions promoting their academic, vocational and civic engagement and learning.

Altogether, existing research points out how it is important to acknowledge that educational efforts that aim at building coherence across young people's digital learning lives across school and out can lead to meaningful and transformative engagement, learning and identity building can only emerge through sustained collective efforts. Without an appropriate curriculum and pedagogical working culture that transform traditional learning practices, digital media and the knowledge funds of contemporary youth are initially likely to represent a mere additional layer to schooling with a likelihood of even counter-productive consequences. Furthermore, whilst creating education that extends across young people's social ecologies, it is thus not just a matter of implementing and putting into use alternative pedagogical ideas and technologies, but in many cases, it is also a matter of transforming simultaneously existing social practices. Co-evolution of the social and technological infrastructures of education should be the starting point for expanded and hybrid learning opportunities (Kumpulainen, Mikkola, & Jaatinen, 2013).

Authentic, current and complex real-life problems

Facilitating learning across sites and contexts also demands educational activities that are authentic, current and complex real-life problems (Hakkarainen, 2010). These learning activities can have the potential to transform the forms of students' engagement by expanding the requirements for engagement and bringing in new audiences with whom students pose questions, share and discuss their observations, opinions, reflections as well as co-develop new knowledge and understanding. In these situations, students are likely to see the meaningfulness and applicability of their learning within and beyond the school. When doing so, new audiences respond, thus providing students with feedback about the feasibility of their ideas and work. In essence, the culture of learning mediated by hybrid approach leaves room for creativity, renegotiations and surprises. Addressing authentic problems and tasks requires the teacher and students to work with open, flexible and tentative plans and goals that might not be clear from the outset, and need reconfiguring also along the way (Rajala et al., 2013).

Enacting educational opportunities that stretch across sites and contexts also require transformative actions on the part of the teachers (Lipponen & Kumpulainen, 2011). In particular, pursuing a transformative stance to traditional pedagogical practice that is typically limited in space and time and dominated by narrow and authoritative stance can result in conflicts and contradictions (Brown & Renshaw, 2000). However, questioning current practices and seeing alternative futures are pivotal pre-requisites in transforming social practices (Engeström & Sannino, 2010). Also, in order to connect learning and teaching to expert communities outside school, teachers and schools need to build partnerships and networks. Building networks and partnerships also requires new competences from teachers, such as being able to engage in multi-professional collaboration (Kumpulainen et al., 2010). In sum, to build education that is responsive to young people's learning and identity building across sites and contexts requires transformation at many levels that create the systemic whole.

Conclusions

Existing research among youth has revealed that in contrast with the view of dissatisfied 'Net Generation' people who do not value school, there is evidence that are a number of young people

who regard school as a valuable learning environment (Bennett, Maton, & Kervin, 2008). Yet, it is the object and nature of learning that makes schoolwork easily irrelevant and meaningless. It is unwise to assume that the interest, motivation or affinity of all young people will be automatically enhanced by the simple inclusion of digital media technologies in educational contexts. In fact, without a meaningful pedagogical agenda, students can react negatively to the use of technologies and media in formal education, what they may perceive as teachers' attempts to colonise their free-time domains (Sharples, 2006). Indeed, a number of researchers warn against attempts to motivate and engage students simply through the introduction of consciously trendy forms of media technology into educational processes. Young people are unlikely to be automatically enthused and motivated by the use of digital technologies, social media and gaming for educational purpose, if these technologies are not meaningfully integrated into learning practices and pedagogies that support their authentic and transformative engagement (Kumpulainen, Mikkola, & Jaatinen, 2013).

Education that is responsive to young people's social ecologies is part of a longstanding tradition in progressive education that has stressed the importance of civic engagement, connecting schools with the wider world, and the value of hands-on and social learning (Dewey, 1916). Today's digital technologies and media offer us the ability to pursue these progressive goals in new ways through purposeful integration of tools for social connection, knowledge co-creation, and linking the classroom, community and home. From this perspective, the role and position of the school in the digital age needs to be seen not in opposition to youth cultures nor as 'digital enrichment' of traditional schooling but rather conceptualizing school as an important element of all young people's social ecologies for engagement, learning and identity building in and for the digital age.

Education that stretches across sites and contexts has implications for schools, including curriculum, pedagogies and the design of learning environments. Conceiving the school as a meeting place for different identities, interests, and discourses reveals the potential of formal education to become a site where no cultural ways of being and acting are secondary but important focuses of joint attention, analysis and reflection (Gutiérrez, Bien, Selland, & Pierce,

2011). At best, it can provide teachers with a more holistic way of thinking about their students, directing attention to epistemic and ontological dimensions of young people's learning and becoming. Yet, as our narrative review reveals, little attention has been paid into educational activities that position children as active, creative and critical investigators of and with digital technologies. Moreover, at present there is a dearth of knowledge for creating learning opportunities for digital competencies that are inclusive for diverse learners with different capabilities and interests, and that are able to accommodate their different personal situations and objectives and combine, for example, formal and informal learning (Kumpulainen & Mikkola, 2014). In sum, these realities point out the urgent need for research and development of innovative pedagogies as to ensure meaningful learning experiences that enhance every children's digital competencies already early on.

It is clear that further research is necessary in order to better understand young people's learning and identity building in education that aims to build convergence in young people's social ecologies via the mediating influence of digital technologies and media. In specific, there is a need for research studies that look into the dynamics of young people's learning (sense-making) and becoming (self-making) at the intersection of multiple sites and contexts mediated by digital technologies and media. This seems as a serious deficiency that should be overcome as to gain a better understanding about the values and learning identities young people themselves wish to pursue in the moment and in their futures.

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